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Taxonomic paper

First record of the male of the widespread *Calliscelio elegans* (Perkins) (Hymenoptera, Platygastridae) along with some taxonomic notes on the species

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Abstract

The hitherto unknown male of the widespread and tramp species, *Calliscelio elegans* (Hymenoptera, Platygastridae) is hereby reported for the first time, from India. The two sexes are chromatically quite similar. The male has the same conspicuous banding pattern in the forewing as that of the female. The status of *Calotelea tanugatra* Narendran (Hymenoptera, Platygastridae) from India is reviewed and is proposed to be a junior synonym of *Calliscelio elegans*, new synonymy. Distribution of *C. elegans* in India is mapped.

Keywords

Calliscelio elegans, male, *Calotelea tanugatra*, new synonymy, Platygastridae, India.

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Introduction

Calliscelio Ashmead 1893, (Hymenoptera: Platygastridae) with type species *Calliscelio laticinctus* Ashmead is a rather small genus, with 65 species http://hol.osu.edu/index.html?id=461. One strikingly colourful species, *C. elegans* (Perkins, 1910), is quite widespread throughout the tropics, likely distributed by human commerce, possibly in association with cricket pests (Orthoptera: Gryllidae) of sugar cane, cf. Masner et al. (2009)

During our taxonomic studies on the platygastrid subfamily Scelioninae of India, we identified 12 specimens of *C. elegans*, from a series of Malaise trap samples from the semi-evergreen forests of Biligirirangan Hills, situated at the conjunction of the Western and the Eastern Ghats in Karnataka, South India. The hitherto unknown male of *Calliscelio elegans* was spotted among the collections, and forms the first ever report of the male of this species. The two sexes are chromatically quite similar (Figs 1, 7). The male has the same conspicuous banding pattern in the forewing (Fig. 8) as that of the female.

Figure 1.

C. elegans Body profile (Male)

Figure 2.

C. elegans Head Dorsal View (Male)

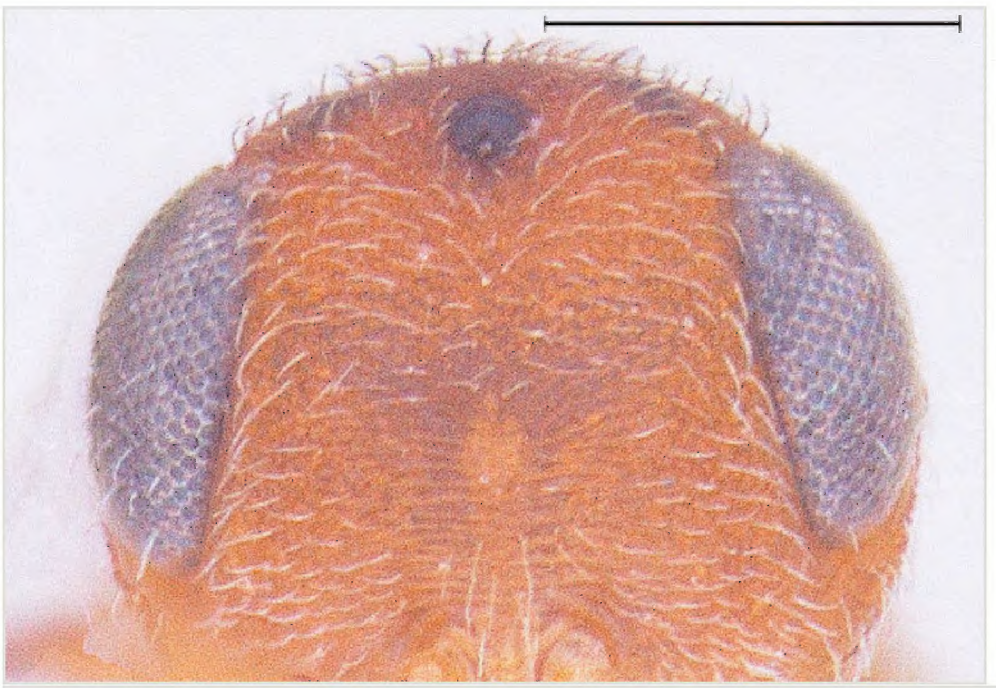

Figure 3.

C. elegans Head Front view (Male)

Figure 4.

C. elegans Mesosoma dorsal view (Male)

Figure 5.

C. elegans Metasoma dorsal view (Male)

Figure 6.

C. elegans Antenna (Male)

Figure 7.

C. elegans Body profile (Female)

Figure 8.

C. elegans Forewing (Male)

We examined the types of Scelioninae at The National Zoological Collection at Western Ghat Regional Centre, Zoological Survey of India and hereby propose *Calotelea tanugatra* Narendran, 1998 (Fig. 9) to be a junior synonym of *Calliscelio elegans* (Perkins).

Figure 9.

Calotelea tanugatra Holotype (Female)

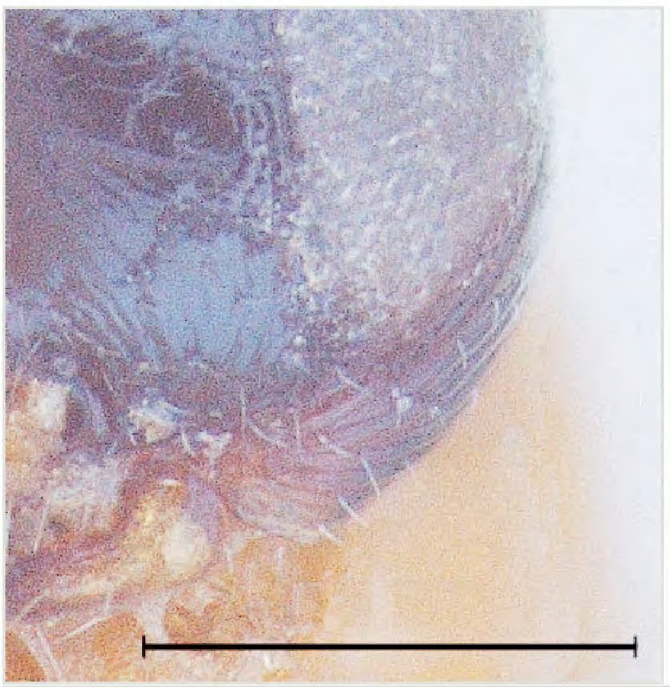

Figure 10.

Genal and facial striations of *Calotelea* sp.

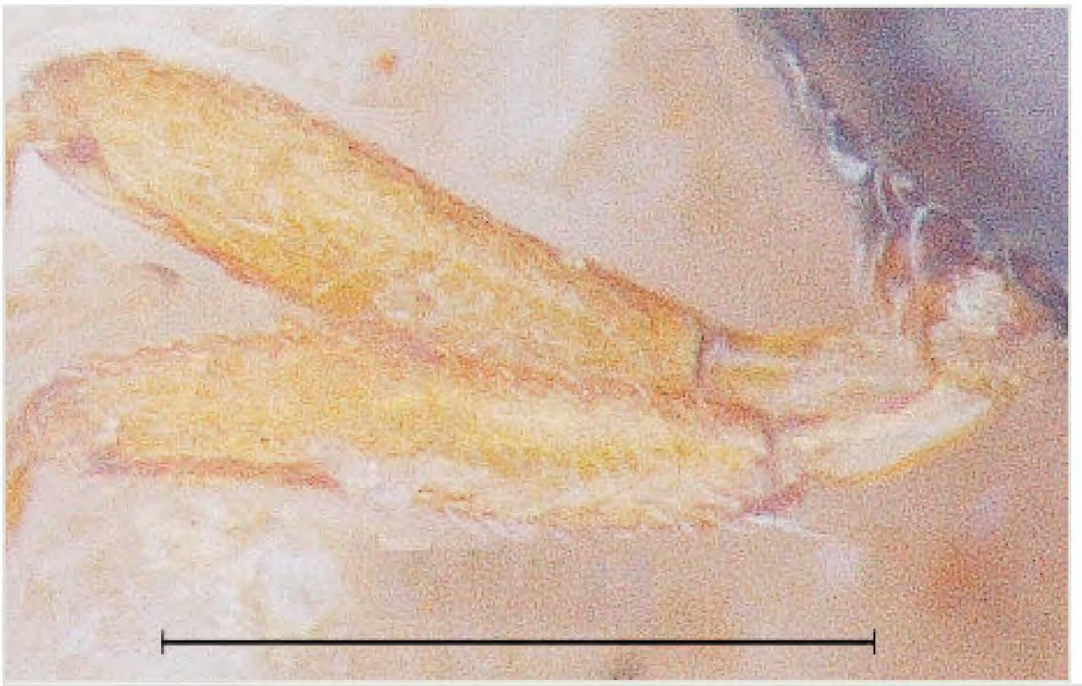

Figure 11.

Elongate antennal radicle of *Calotelea* sp.

A distribution map of *C. elegans* in India is provided (Fig. 12).

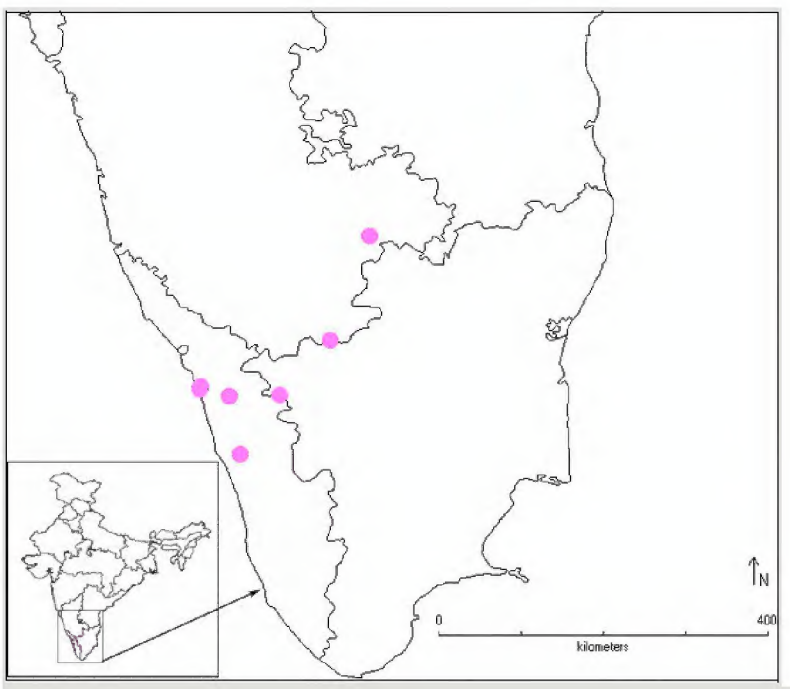

Figure 12.

Distribution map of *C. elegans* in India

Materials and methods

Specimens for this study belonged to National Zoological Collection, at Zoological Survey Of India, Calicut (ZSIC) and also those received on loan from Western Ghats Insect Inventory Programme of Atree, Bangalore. The description and imaging work were carried out by employing Leica M205A stereomicroscope and Leica DFC-500 digital camera. The species distribution map has been generated using DIVA GIS version 7.4.

Morphological terminology follows (Masner 1980a, Masner 1980c and Mikó et al. 2007). The scale bars in Figs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 are 0.2mm, except Fig. 7 being 0.5 mm.

Abbreviations

OOL – Ocellocular Length; OD – Ocellar Diameter; POL – Posterior Ocellar Length; IOS – Inter Ocular Space; A1-A12 – antennal segments; T1-T8 – tergites of metasoma; HL – Head Length; HW – Head Width; L – Length; W – Width; ML – Mesosoma Length; MW – Mesosoma Width; MTL – Metasoma Length; MTW – Metasoma Width.

ZSIC – Zoological Survey of India, Calicut.

Taxon treatments

Calliscelio elegans Perkins (1910)

Nomenclature

Caloteleia elegans Perkins 1910: 624. Original description.

Caenoteleia elegans Kieffer 1926: 550. Generic transfer, description.

Calliscelio elegans Masner, Johnson & Musetti, 2009: Masner et al. 2009: 61. Description, diagnosis, generic transfer.

Calotelea tanugatra Narendran 1998: 71. Female, India (ZSIC) Holotype examined, **syn. nov.**

Materials

a. scientificNameID: Calliscelio elegans; kingdom: Animalia; phylum: Arthropoda; class: Insecta; order: Hymenoptera; family: Platygastridae; genus: Calliscelio; specificEpithet: elegans; scientificNameAuthorship: Perkins; continent: Asia; country: India; stateProvince: Karnataka; locality: Biligiriranga Hills; verbatimLocality: Mariappanappala; decimalLatitude: 11.785169 N; decimalLongitude: 77.223671 E; samplingProtocol: Malaise trap; eventDate: 2007-4-20/5-20; habitat: Semi-evergreen; eventRemarks: Collected in Malaise trap; individualID: ZSI/WGRS/IR.INV.2655; individualCount: 1; sex: Male; lifeStage: Adult; preparations: Card mount; recordedBy: Priyadarshan; identifiedBy: Rajmohana K; dateIdentified: 2013-6-1; identificationRemarks: First male of the species ever recorded; institutionID: ZSIC

b. scientificNameID: Calliscelio elegans; kingdom: Animalia; phylum: Arthropoda; class: Insecta; order: Hymenoptera; family: Platygastridae; genus: Calliscelio; specificEpithet: elegans; scientificNameAuthorship: Perkins; continent: Asia; country: India; stateProvince: Karnataka; locality: Biligiriranga Hills; verbatimLocality: Mariappanappala; decimalLatitude: 11.785169 N; decimalLongitude: 77.223671 E; eventDate: 2007-4-20/5-20; habitat: Semi-evergreen; eventRemarks: Collected in Malaise trap;

individualID: ZSI/WGRS/IR.INV.2700-2705; individualCount: 5; sex: Female; lifeStage: Adult; preparations: In Alcohol; recordedBy: Priyadarshan; identifiedBy: Rajmohana K; dateIdentified: 2013-6-1; institutionID: ZSIC

c. scientificNameID: Calliscelio elegans; kingdom: Animalia; phylum: Arthropoda; class: Insecta; order: Hymenoptera; family: Platygastridae; genus: Calliscelio; specificEpithet: elegans; scientificNameAuthorship: Perkins; continent: Asia; country: India; stateProvince: Karnataka; locality: Biligiriranga Hills; verbatimLocality: Mariappanappala; decimalLatitude: 11.785169 N; decimalLongitude: 77.223671 E; eventDate: 2007-11-15/12-15; habitat: Semi-evergreen; eventRemarks: Collected in Malaise trap; individualID: Atree /BR/10-16; individualCount: 6; sex: Female; lifeStage: Adult; preparations: In Alcohol; recordedBy: Priyadarshan; identifiedBy: Rajmohana K; dateIdentified: 2013-6-1; institutionID: ZSIC

d. scientificNameID: Calliscelio elegans; kingdom: Animalia; phylum: Arthropoda; class: Insecta; order: Hymenoptera; family: Platygastridae; genus: Calliscelio; specificEpithet: elegans; scientificNameAuthorship: Perkins; continent: Asia; country: India; stateProvince: Kerala; locality: Trichur; verbatimLocality: Chimmony Damsite; decimalLatitude: 10.523100 N; decimalLongitude: 76.222221 E; verbatimEventDate: 2012-1-5; habitat: Mixed Vegetation; eventRemarks: Collected in Sweep net; individualID: ZSI/WGRS/IR.INV.2485; individualCount: 1; sex: Female; lifeStage: Adult; preparations: Card mount; recordedBy: Abhilash Peter; identifiedBy: Rajmohana K; dateIdentified: 2013-3-6; institutionID: ZSIC

e. scientificNameID: Calliscelio elegans; kingdom: Animalia; phylum: Arthropoda; class: Insecta; order: Hymenoptera; family: Platygastridae; genus: Calliscelio; specificEpithet: elegans; scientificNameAuthorship: Perkins; continent: Asia; country: India; stateProvince: Kerala; locality: Calicut; verbatimLocality: Jaferkhan Colony; decimalLatitude: 11.266666 N; decimalLongitude: 75.791001 E; verbatimEventDate: 2010-9-8; habitat: Mixed Vegetation; eventRemarks: Collected in Sweep net; individualID: ZSI/WGRS/IR.INV.2486; individualCount: 1; sex: Female; lifeStage: Adult; preparations: Card mount; recordedBy: Bijoy. C; identifiedBy: Rajmohana K; dateIdentified: 2011-5-15; institutionID: ZSIC

f. scientificNameID: Calliscelio elegans; kingdom: Animalia; phylum: Arthropoda; class: Insecta; order: Hymenoptera; family: Platygastridae; genus: Calliscelio; specificEpithet: elegans; scientificNameAuthorship: Perkins; continent: Asia; country: India; stateProvince: Kerala; locality: Calicut; verbatimLocality: Tiruvannur; decimalLatitude: 11.247655 N; decimalLongitude: 75.767650 E; verbatimEventDate: 2005-8-11; habitat: Mixed Vegetation; eventRemarks: Collected in Sweep net; individualID: ZSI/WGRS/IR.INV.2637; individualCount: 1; sex: Female; lifeStage: Adult; preparations: Card mount; recordedBy: Rajmohana.K; identifiedBy: Rajmohana K; dateIdentified: 2005-12-10; institutionID: ZSIC

Description

New Description of Male. Length: 1.97mm (n=1) (Fig. 1). Head, mesosoma, T1 wholly and anterior one-fourth of T2, legs and A1 deep orange yellow; posterior three-fourth of T2 onwards till T8, A3-A12 ebony black, A2 and ocelli darkened (Fig. 2); frons (Fig. 3) and mesoscutum medially with a pair of dark patches (Fig. 4); apex of mandibles and apex of hind femur slightly darkened; forewing conspicuously banded, with dark bands basally, medially and apically, separated by light bands (Fig. 8), with median band being most prominent as seen in females (Fig. 7).

Qualitative characters of head and mesosoma being exactly similar to that of female as mentioned in Masner et al. (2009), is not repeated here. However propodeum being flat and elongate, with faint longitudinal striae and irregular rugosities differs from that of the female.

Metasoma elongate, widest medially, narrowed both anteriorly and posteriorly (Fig. 5); T1 with fine longitudinal striae and irregular rugose sculpture covering entire surface, almost similar to that on propodeum; longitudinal striae on T2 extending to 0.8 its length medially and about 0.5 of its length laterally. T3 distinctly transverse, shorter than T2, with delicate longitudinal aciculate sculpture, effaced medially; T4-T8 transverse, with delicate coriaceous microsculpture and with abundant appressed golden pilosity.

General body measurements, length to width proportions of antennal segments, forewing and that of metasomal segments are as follows:

Head (dorsal) L:W = 4.05:2.61mm; IOS = 1.14x eye height; POL:LOL:OOL:OD = 1.32:0.75:0.2:0.3.

A1 4.2x length of radicle, A2 1.05x longer than radicle; A3 and A4 subequal; A5 emarginate and carinate (Fig. 6), 1.15x longer than A4 and 1.02X length of A6; A6 to A8 subequal, A9 to A12 subequal as long as A3, A12 longest, 1.37x A11. Length to width proportions of antennal segments from A1to A12 being 23:5.4, 5.7:4, 8:4, 8:4, 9.2:4.7, 9:4, 9:4, 9:4, 8:4, 8:4, 8:4, 11:4 (Fig. 6).

ML:MW = 4.15: 3.38; Forewing narrow, 5.4x as long as wide, when at rest extending to base of T5; length of veins marginal: stigmal: postmarginal being 6:7:8.

MTL:MTW = 2.03:1.19; T2 longest of all tergites, 1.6x T1 and 1.38x T3 tergite; length to width proportions of T1-T4 being 127:85, 204:170, 148:203, 78:169; T3 onwards transverse; rest of tergites visible as strips; T8 distinct.

Diagnosis

Variation: Hardly showing any variation from the description of the female by Masner et al. (2009), except for its smaller size (< 2 mm). A pair of dark patches seen on median mesoscutum is not distinct in females. A few of the dense granulations on median frons appear fused as short, coarse irregular strips of striae (Fig. 3), but such a partially striated nature of median frons is seen in all the female specimens of *C. elegans* included in this study as well.

The eyes of one of the freshly caught specimen female had a beautiful peacock green metallic lustre (Fig. 7), but turned black within 24 hours of dry preservation.

Distribution

The species is widely distributed (http://osuc.biosci.ohio-state.edu/hymDB/eol_scelionidae.content_page?page_level=3&page_id=taxon_page_data&page_version=245756&page_option1=M) but generally seen in low numbers (Masner et al. 2009). The distribution of *C. elegans* in India has been mapped (Fig. 12). It is reported only from the southern states of the country.

Ecology

Females are mostly seen close to ground, in search of gryllid eggs for oviposition.

Biology

Egg parasitoid of crickets (Orthoptera: Gryllidae) as per Masner et al. (2009). The females are seen in low numbers, but the males are extremely rare.

Calotelea tanugatra Narendran, 1998

Nomenclature

Calotelea tanugatra Narendran (1998), **syn. nov.** (Fig. 9).

Material

Holotype:

a. kingdom: Animalia; phylum: Arthropoda; class: Insecta; order: Hymenoptera; family: Platygastridae; taxonRank: species; genus: Calotelea; specificEpithet: tanugatra; scientificNameAuthorship: Narendran TC; continent: Asia; country: India; stateProvince: Kerala; locality: Malappuram; verbatimLocality: Calicut University Campus; decimalLatitude: 11.169961 N; decimalLongitude: 76.102710 E; year: 1983; month: October; day: 12; habitat: Mixed Vegetation; eventRemarks: Captured by Sweep net; individualID: ZSI/WGRS/I.R-INV.1317; individualCount: 1; sex: Female; lifeStage: Adult; preparations: Point Card mount; catalogNumber: ZSIC-1.0189; recordedBy: Narendran TC; identifiedBy: Narendran TC; dateIdentified: 1998; institutionCode: ZSIC

Taxon discussion

As per the generic concept of *Calotelea* Westwood, in Hope (1837), Masner (1976), Masner (1980b), Masner (1980c), http://www.zsi.gov.in/right_menu/IIS/index.html and Popovici et al. (2013), diagnosis of the genus from the very similar *Calliscelio* Ashmead, relies on the presence of skaphion in most cases, distinct or at least traces of genal and facial straie (Fig. 10) and an elongate antennal radicle, often measuring about one-third of scape length (Fig. 11). Cheeks and gena are never striate in *Calliscelio* and the antennal radicle is usually short, at most one-fourth length of scape

(http://www.zsi.gov.in/right_menu/IIS/index.html). *Calotelea tanugatra* Narendran does not have any traces of striae on mandibular corners or cheeks and antennal radicle is less than one-fourth of scape length. Hence the placement of *C. tanugatra* under *Calotelea* is incorrect. Instead the species agrees in all aspects including the character states, proportions and colouration of the body and wings to *C. elegans* as stated in Masner et al. (2009). In contrast to most *Calliscelio* species, the metascutellar plate is extremely narrow and weakly concave medially in *C. elegans*, as seen at times in *Calotelea*. Such a metascutellar plate is seen in *Calotelea tanugatra* too. Hence *Calotelea tanugatra* Narendran (Hymenoptera, Platygastridae) after the current review, is proposed to be a junior synonym of *Calliscelio elegans*, new synonymy.

Notes

Quoting Narendran (1998), "forewing with a median blackish brown band surrounded basically and apically by hyaline patches, basal and apical part infumate,"- the banding pattern of forewing (Fig. 9) is correctly described, but the pattern in the illustration as of page 72, does not match the description.

Discussion

Masner et al. (2009) studied 60 female specimens of *C. elegans* from all over the world, but no males were available for their study. From this observed lack of representation of male specimens in the world collections, it was opined that the male sex may either be chromatically different from the female and not so conspicuous or the species can even be thelyotokus. This fact is however disproved by our report and description of the male of *C. elegans* in this study. It can be concluded that males are extremely rare compared to females and that both the sexes of *C. elegans* are chromatically quite similar, with the same conspicuous banding pattern on their forewings.

Acknowledgements

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Author contributions

Rajmohana K.: Description of male *C. elegans* and developing the concept of synonymy of *Calotelea tanugatra*

Abhilash Peter: Specimen preparation, imaging and manuscript preparation

Narendran T.C.: Discussions on the concept of synonymy

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